Vieley Bridge
Spanning the North Fork Vermilion River
Saunemin vicinity
Livingston County
Illinois

HAER No. IL-22

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
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HISTORIC AMERICAN ENGINEERING RECORD

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Location:	Spanning the North Fork Vermilion River at Township Road 220D, between NE 1/4 Section 7 and NW 1/4 Section 8 Township 27 North, Range 7 East of the 3rd Principal Meridian, 4 miles south, 2 miles west of Saunemin, Livingston County, Illinois State Plane Coordinates: East-West 46800, North 1489200, Zone 1 Quad: Forrest North, Illinois
Date of Construction:	Circa 1860-1880 1906 (present location)
Present Owners:	Saunemin and Pleasant Ridge Road Districts, Livingston County, Illinois c/o Livingston County Highway Department R. R. #4 Pontiac, Illinois 61764
Present Use:	One-lane highway bridge, posted for maximum three-ton vehicular load. Projected date of removal is summer 1986.
Significance:	The Vieley Bridge is one of two iron and steel bowstring arch truss bridges of the Phoenix Ring upper chord design remaining in Livingston County. The bridge possesses significance as an example of the early development of structural engineering in the United States.
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Edited, Retyped and Transmitted by:	Jean P. Yearby, HAER, 1987

I. HISTORY

A. Need for the Bridge

During the early 1900s, an effort was made in Livingston County to control flooding along the North Fork Vermilion River between its confluence with the South Fork Vermilion River and the County Line 14 miles to the east. The ground in this vicinity was dense, poorly-drained timber and prairie soil which was difficult to till. In an effort to improve drainage in this area, the first dredging of the North Fork Vermilion River was performed around 1904. The larger channel made by the dredging operates created a need for longer bridges to span the increased width of the new channel. The existing bridge at the present site of the Vieley Bridge was one of the bridges affected.

Plans for the construction of the Vieley (occasionally spelled Veiley) Bridge were initiated on April 28, 1906, in the form of a petition to the Livingston County Board of Supervisors for one-half the cost of constructing a new bridge. The petition, signed by the Highway Commissioners of Saunemin Township, estimated the cost of a new structure at $4,000.00, which was greater than the required 20 cents on the $100 on the latest assessment roll of Saunemin Township to qualify for County Bridge Aid funding.

A meeting was held at the bridge site on May 15, 1906, to discuss the petition for a new bridge. Those in attendance representing Saunemin Township were Highway Commissions M. R. Maxon and James Harris, Township Supervisor Spafford, and Township Clerk James Lanning. Those present from Pleasant Ridge Township were Highway Commissioners O. Holloway, F. C. Dewey, and G. F. Goodale, and Township Clerk A. L. Stuckey. Representing the Bridge Committee of the County Board of Supervisors were Shakelton, Walsh, and M. Cleary. A motion was made and carried to allow the petition of the highway commissioners for a new bridge at the site.

The following specifications were adopted at this meeting and were presented to the Livingston County Board of Supervisors at its June 13, 1906, meeting:

> "One span 122 feet, high truss, 16 foot roadway, two approaches 40 feet each, legs 11 feet on approaches, and concrete abutments and concrete wings; eight lines of joice (sic), 6 inch; 3 inch thick by 10 inch wide No. 1 plank flooring."

B. Construction Chronology

The bridge committee met with the commissioners of Saunemin and Pleasant Ridge townships on May 22, 1906, at the court house in Pontiac to let the contract for the bridge. The contract called for the bridge companies to bid on their own plans, but the plans were to be in accordance with the specifications of the committee. The following bids were received:

Company	Concrete	Iron
Joliet Bridge and Iron Company	$3660	$3680
Continental Bridge Company	$3800	$3790
Bloomington Bridge Company	$3888	$3888
Joliet Steel Construction Company	$3865	$3865
Burnham and Ives	$3980	$3980
Missouri Bridge Company	$3809	$3809

Apparently all bids were rejected and a motion was made to accept the Continental Bridge Company bid on "Plan C" for $3300. One-half the cost or $1650 was to be paid by Livingston County and the remaining one-half was to be paid by Saunemin and Pleasant Ridge townships.

The County Bridge Committee met with the Township Highway Commissioners on March 8, 1907, to inspect the new structure and moved to withhold $1000 payment from Continental Bridge Company, until such time when the "abutments were completed and accepted." On August 27, 1907, the committee met again at the bridge and accepted the rebuilt abutments that were rejected at the previous meeting. Final payment to Continental Bridge Company was authorized at the September 11, 1907, meeting of the county supervisors.

II. THE BRIDGE

Tbe structure, as it exists today, is described as follows: A three-span iron and steel truss bridge, two Pratt pony truss approach spans at 39 feet center to center of bearings, one through bowstring arch truss at 122 feet 8 inches center to center of bearings, timber deck, 15.8 feet clear roadway, 205.5 feet back to back of abutments, closed concrete abutments and wingwalls and concrete-filled steel boiler plate caisson piers.

The Vieley Bridge, apparently named after an adjacent landowner at the time of construction, is one of two iron and steel bowstring arch truss bridges of the Phoenix Ring upper chord designed located in Livingston County. It is estimated from sources in the Illinois Department of Conservation that this structure may be one of only 10 remaining examples of bowstring arch trusses in Illinois. The bridge possesses significant elements of the early development of iron and steel truss design in the United States.

The structure actually represents two different sequences of truss design in this country. The main truss is an example of the bowstring arch design, while the two approach trusses represent the more common Pratt pony truss. The development of the bowstring arch is attributed to Squire Whipple in 1840; however, it never achieved great popularity and was not fabricated much beyond 1880. This would lend credence to the speculation that the bowstring arch trusses of the Vieley Bridge are actually older than the 1906 construction date as documented. Also, the fact that all of the bids were initially rejected and that "Plan C" of the Continental Bridge Company was accepted at a lower price could indicate that the bridge company presented a counter proposal to erect a used bridge at the site. Moving bridges to lower volume roads was not common during the early 20th century. Hearsay evidence traces this bowstring arch to Kankakee, Illinois, where it purportedly spanned the Kankakee River, although documentation to this effect has not been found.

The bowstring arch is characterized by the omnipresent arched upper chord. The design differs from most truss types in that the deck, floor beams and stringers are suspended from the upper chord, thus placing all vertical members in tension. The outward thrust of the arched upper chord compression member is resisted by the lower chord, which is placed in tension.

The Phoenix Ring or Phoenix Column design of this structure is in reference to the manner in which the upper chord is fabricated. The member is composed of four 1/4-inch thick quarter circle plates with 3-inch channel irons running longitudinally along the top and bottom of the chord. The sections are rivetted together along 1-1/2-inch flanges with a 3/16-inch thick transverse center plate dividing the hollow circular cross section in half. This circular section measures 11 inches out to out. The arch measures 16 feet 6 inches from center of lower chord to center of upper chord at its apex. The minimum vertical clearance for traffic due to the later bracing between the trusses is 13 feet 5 inches.

maximum

The main truss is composed of 12 panels approximately 10 feet long. The vertical members consist of 1-1/2-inch diameter iron rods at the outside panel points and 2-1/4-inch cast cross bars at all other points. The diagonals are all 1-inch diameter iron bars. All connections to the upper and lower chords are by threaded rod and nut, except the diagonals which are bolted through an eye in the bar at the lower chord connection.

The lower chord of the bowstring arch is comprised of two 6-inch by 5/8-inch thick steel plates. The 10-inch floor beams are hung from the lower chord by means of a 1-inch diameter iron pin and a 1-inch square hanger with bolted lower connections.

The stringers consist of six lines of 6-inch I-beams and two lines of 6-inch outside channel irons at approximately 25-inch centers. The timber deck is composed of 3-inch by 12-inch transverse planking with nine lines of 2-inch by 12-inch nailed planks serving as runners.

The entire span is supported by four 3-1/2-foot diameter concrete-filled boiler plate caissons. The south caissons were protected from 1955 dredging operations by driving steel sheet piling around each caisson and filling the void with concrete. This is the only known modifications of the substructure.

The Pratt pony truss approach spans of the Vieley Bridge are more representative of the truss types that were being built in Livingston County around the turn of the century. This design was used until reinforced concrete arch and through girder construction became popular around 1920.

Each panel of the Pratt truss approach spans measure 13 feet long by 5 feet 6 inches high. The upper chords are 29 feet long and the lower chords are 39 feet center to center of bearings. The structural members are constructed of rivetted angles, channels and 1/4-inch thick steel plates. The upper chords and endposts consist of two 5-inch by 1-3/4-inch channels set back to back and capped with a 10-inch by 1/4-inch-thick plat, while the lower chord is composed of double 2-inch by 2-inch by 1/4-inch-thick angles. The vertical compression members are double 4-inch by 1-1/2-inch channels laced with 1-1/4-inch by 1/4-inch-thick straps in a zigzag fashion. The diagonals are double 2-1/2-inch by 2-1/2-inch by 1/4-inch-thick angles.

The lower chord connections at the floor beams display two forms of fastenings. The diagonals and verticals are bolted to a 1/4-inch-thick gussett plate at the lower panel point, while the lower chord is rivetted to the plate. The combination of rivetted and bolted connections may be a further indication that the structure was moved from another location and reerected using bolted connections.

The 12-inch floor beams support 6 lines of 6-inch I-beam stringers and two lines of 6-inch outside channels at 26-1/2-inch spacing. The timber deck is a continuation of the deck, as previously described.

The endposts of the approach spans were repaired in 1976 by welding 1/4-inch thick steel plates near the bearing seats, in order to reinforce the badly-deteriorated steel. The only other modification of the original design was made by the replacement of several lateral cross bracing bars on the underside of the deck at some unknown date.

The Vieley Bridge has exceeded the normal life expectancy of light iron truss bridges. It displays a great deal of integrity for its age, although the structural members are badly pitted and rusted. The timber deck is also in poor shape, with many of the runners either rotted or missing. Its three-ton maximum load limit, narrow width, and substandard horizontal alignment create unacceptable hazards for the safe movement of traffic across the river. A new, reinforced concrete deck bridge on continuous wide flange steel beams has been designed to correct these deficiencies at the river crossing.

An opportunity has been given to any parties interested in salvaging the bridge, although none has expressed an interest in removing and maintaining it at another location. Prior to its removal, the Illinois Department of Conservation will be given an opportunity to salvage any parts of the structure that is deemed significant to American engineering technology.

III. BIBLIOGRAPHICAL REFERENCES

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